

REMARKS

Claims 1-4 and 6-45 are pending. No claims are currently canceled. No claims have been added. Claims 21 to 45 have been withdrawn from consideration. Claims 1, 6, 11, 14, 16, 19, 24, 25, 27, and 28 are currently amended. Reconsideration of the application is requested.

Claims 1, 14, 16, 25 and 27 are amended to clarify that the indicated oligomers comprise the polymerized, ethylenically unsaturated monomer units recited and to delete the language "derived from ...". The claims are further amended to recite that the polar monomers are distinct from the "poly(alkylene oxide) containing monomer", per page 14, lines 10-11. Claims 11, 19 and 28 are amended to corrected grammatical errors. Claims 6 and 24 are amended to clarify Applicant's use of the term "residual".

§ 112 Rejections

Claims 4-6, 14-16 and 20 are rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

The Office Action find the clause "average degree of polymerization" indefinite. Applicants disagree. The term refers to the number of repeat units in the oligomer, and is therefore related to, but is not a function of, the molecular weight of the oligomer. Molecular weight of a polymer (or oligomer) is a function of the molecular weight of the constituent monomers. Applicant's further assert that the term is well known in the art, as evidenced by the Encyclopedia of Polymer Science and Engineering, provided as an appendix to this response.

Applicants use the term in the context of having a degree of polymer less than 300, or less than the entanglement molecular weight of the oligomer. As taught on page 17 the greater than expected viscosity (for polymers having a degree of polymerization greater than 300), is attributed to entanglements of polymer chains. It has been shown empirically that polymers or oligomers with less than 300 repeat units are not entangled. Thus, with the present oligomers, the slope of the log-log plot of viscosity vs. molecular weight (M_n) is about 1, whereas for higher molecular weight polymers the slope is 3.4.

Claim 6 includes the terms “residuals”. The Office Action asserts it is not clear what is meant by the term “residual”. At page 6, lines 5-6, and at page 18, line 13, the term refers to monomer and/or solvents, plasticizers or viscosity modifiers; i.e. low molecular weight materials that may affect the physical properties, the processing, or the desired end uses. At page 24, lines 14 to 17, the specification states that the gel materials are substantially free of residuals, which “can migrate to other parts of a dressing, for example, which can be detrimental to the integrity of the dressing, or into the body of the patient on which the dressing is disposed”.

Claims 6 and 24 have been amended to clarify the meaning of the term by inserting the phrase “monomer and solvent” after the word “residual”.

Claim 14 recites the phrase “derived from polar monomer”. The claim has been amended to removed the objectionable phrase “derived from”, and further amend to recite that the polar monomers are exclusive of the poly(alkylene oxide)-containing monomer.

Although claim 20 is rejected, the Office Action provided no basis. Applicant’s request an explanation of the grounds of rejection, and an opportunity to reply.

In summary, Applicant submits (or Applicants submit) that the rejection of claims 4-6, 14-16 and 20 under 35 USC § 112, second paragraph, has been overcome, and that the rejection should be withdrawn.

Double Patenting Rejections

Claims 1-4 and 6-20 stand rejected under the judicially-created doctrine of obviousness-type double patenting over claims 1-23 of U.S. 7,074,839 (Fansler et al.). The rejection is traversed.

Applicants claim a curable composition having a first oligomer with a nucleophilic group, and a second oligomer with a co-reactive electrophilic group (or visa-versa). The reactive and co-reactive functional groups form a crosslink between the first and second component oligomers by forming a linking group between the electrophilic and nucleophilic functional group pairs, and may include reactions commonly referred to as displacement, condensation and addition reactions, rather than polymerization of ethylenically-unsaturated groups. See page 12, lines 18 to 27, and Table 1 on pages 13 and 14.

U.S. ‘839 contains neither the first or second oligomer having such co-reactive groups. The reference has a first component oligomer having pendent photoinitiator groups, a second

poly(alkylene oxide) component with ethylenically unsaturated terminal groups, and cures by free-radical addition of ethylenically-unsaturated groups.

In support of the rejection, the Office Action notes that “1,1,1-trichloro groups are electrophilic and peroxide groups are nucleophilic in basic media”. Applicants note that neither of these groups is mentioned in the reference patent. See reference column 7, lines 9-25 for a list of photoinitiator structures contemplated by the reference.. The Examiner is impermissible extending the scope of teachings of the references. Further, to the extent that photopolymerizable groups may be either nucleophilic or electrophilic, there is no teaching in the reference about relying on this purported nucleophilicity or electrophilicity to cure the reference composition. There is further no teaching about choosing a nucleophilic and electrophilic pair to effect the curing of the composition.

The rejection of claims 1-20 over U.S. 7,074,839 (Fansler et al.) has been overcome and should be withdrawn.

Claims 1-4 and 6-20 stand rejected under the judicially-created doctrine of obviousness-type double patenting over claims 1-34 of U.S. Published Application 2005/0194559 (Lewandowski et al.). The rejection is traversed.

U.S. ‘559 contains neither the first or second oligomer having such nucleophilic/electrophilic co-reactive groups. The reference has a first component oligomer having pendent free-radically polymerizable functional groups (such as acrylates), a second poly(alkylene oxide) component with ethylenically unsaturated terminal groups, and cures by free-radical addition of ethylenically-unsaturated groups. As with Fansler et al., there is no teaching in the reference about relying on the purported nucleophilicity or electrophilicity to cure the reference composition, and there is further no teaching about choosing a nucleophilic and electrophilic pair to effect the curing of the composition.

The rejection of claims 1-20 over U.S. Published Application 2005/0194559 has been overcome and should be withdrawn.

§ 102 Rejections

Claims 1-4 and 6-20 are rejected under 35 USC § 102(a) and § 102(e) as being anticipated by WO 03/086493 and also anticipated by U.S. 7,005,143 (Abuelyamen et al.). The rejection is traversed.

The reference is directed a gel material comprising a polymerized poly(oxyalkylene) macromonomer. The macromonomer comprises a poly(oxyalkylene) backbone and terminal acrylate groups. The macromonomer of the reference is described as having “more than one reactive group that is free radically polymerizable..”, and is illustrated by the formula (at several places) as of the formula $XO-(CHR^1-CH_2-O)_m-(CH_2-CH_2-O)_n-Y$, where X and Y are the polymerizable groups. These polymerizable groups are depicted in column 4, 5 and 8. The gel material may further comprise monofunctional poly(oxyalkylene) monomers (column 10, lines 50-62), polar monomers (column 10, line 63 to column 11, line 11), hydrophobic monomers (column 11, lines 12-18) or monomers having a photoinitiator group (column 7, lines 58-63).

Claim 1 may be distinguished from the reference by the limitation of a first a second component oligomer, each of which comprise polymerized, ethylenically unsaturated monomer units. Claim 1 may further be distinguished from the reference by the limitation that the first and second component oligomers have pendent nucleophilic and electrophilic functional groups, respectively, that are mutually co-reactive by a step-growth process; i.e. by functional group rearrangement in the case of step-growth addition or by the elimination of a small molecule such as water or an alcohol in the case of step-growth condensation. The reference neither teaches nor contemplates a curing mechanism by condensation or addition.

In support of the rejection, the Office Action asserts “the macromonomers have nucleophilic and electrophilic pendent groups, such as acrylamide (instant claim 15, structure 3 on page 30), protected functional groups (instant claim 18, structure 5 on page 30) and hydroxyl groups and esters (instant claim 19, structure 5 on page 30)”.

The purported evidence does not support the rejection. The structures on page 5 are illustrative of the polymerizable, terminal functional groups of the reference “X” and “Y” groups of the macromonomer of the formula $XO-(CHR^1-CH_2-O)_m-(CH_2-CH_2-O)_n-Y$. Each of the reference X and Y groups are selected to be free-radically polymerizable, and there is no teaching

or suggestion that the groups are either nucleophilic or electrophilic, nor that the structures would reactive by an addition or condensation reaction. It is extremely unlikely that the sterically hindered acrylamide (structure 3) and the sterically hindered hydroxyl (structure 5) would be particularly nucleophilic. However, were one to concede the nucleophilicity of structures 3 and 5, the reference still lacks the second oligomer of claim 1 (comprising polymerized, ethylenically unsaturated monomer units) having a co-reactive, in this case, electrophilic, functional group, which could subsequently cure by addition or condensation. Further, such groups would be terminal, not pendent.

With further regard to the structure 5, it is not clear what functional group is allegedly represented by the purported “protected functional group”. It is noted that the reference, as it does not teach or suggests curing by addition or condensation, further does not suggest that the reference functional groups may be “deprotected” to participate in an addition or condensation reaction.

The Office Action further asserts “the multifunctional initiator may be difunctional (page 11) thus serving as component b) in [the] instant claims”. Applicants disagree.

The second component of claim 1 is also an oligomer “comprising a plurality of polymerized ethylenically unsaturated monomer units..” Were one to select the macromonomer of page 11, substituted by any of the X and Y groups illustrated, one would not be in possession of Applicant’s component b) oligomer. Nor would such a compound comprise “pendant functional groups co-reactive with said pendant reactive nucleophilic or electrophilic functional groups of said first component oligomer”.

The Office Action also states “[t]he PAO macromonomer can be a copolymer of PEG and polypropylene glycol” with reference to the structure on page 4, and page 10, lines 9-10. If the Office Action is suggesting this structure is the equivalent of Applicant oligomers, it is incorrect. The reference macromonomer have a poly(oxyalkylene) backbone. In contrast, Applicant’s oligomers necessarily have a carbon-carbon backbone resulting from polymerization of ethylenically unsaturated monomers, from which the recited groups are pendent.

Claim 17 is directed to the further limitation of a step-growth catalyst. The Office Action asserts reference claim 52, directed to “applying thermal energy” anticipates the claim arguing “[h]eat is understood to promote chemical reactions, including step growth additions”.

The term is well understood by those skilled in the art, and is described on page 22, lines 12-20.


The rejection of claims 1-4 and 6-20 are rejected under 35 USC § 102(a) and § 102(e) as being anticipated by WO 03/086493 (= U.S. 7,005,143, Abuelyamen et al.). has been overcome and should be withdrawn.

Claims 2-4, 6-45 each add additional features to claim 1. Claim 1 is patentable for the reasons given above. Thus, the dependent claims are likewise patentable.

In view of the above, it is submitted that the application is in condition for allowance. Examination and reconsideration of the application as amended is requested. Applicant's Agent is available for a telephone interview to discuss this Response and advance this case to issuance.

Respectfully submitted,

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Date

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DEGRADATIVE CHAIN TRANSFER. See CHAIN TRANSFER.

DEGREE OF POLYMERIZATION

The degree of polymerization (DP) may be defined as the average number of base units per molecule if the molecules are composed of regularly repeating units, or as the average number of monomeric units (mers) per molecule (1). These definitions are not necessarily equivalent. For example, for condensation polymers prepared from two reactants, the average number of repeating units (base units) per molecule is one-half the number of monomer units.

Also, ambiguities arise in such cases as polyethylene, where the base unit is $\text{—CH}_2\text{—}$, but the monomeric unit is $\text{—CH}_2\text{CH}_2\text{—}$; polymers resulting from

ethylenic polymerization in which the orientation of the units is random, unknown, or head-to-head-tail-to-tail; polymers with different steric configurations; and copolymers, especially if the sequence of the kinds of units is unknown or random.

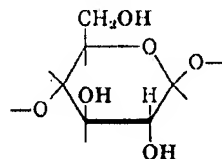
Base units are particularly helpful when dealing with condensation-type polymers; in the case of vinyl-type monomers, the number of monomeric units per molecule is the more useful concept. To remove any doubt, each author is urged to specify precisely the intended meaning of the term. It should be noted further that, except in the case of polymers that are homogeneous with respect to molecular weight, the definition is not precise unless the kind of averaging is specified.

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DEGREE OF SUBSTITUTION

The degree of substitution (DS) of a polymer is the (average) number of substituent groups attached per base unit (in the case of condensation polymers) or per monomeric unit (in the case of addition polymers). The term has been used mainly in cellulose chemistry where each anhydroglucose (β -glucopyranose) unit has three reactive (hydroxyl) groups; degrees of substitution may therefore range from zero (cellulose itself) to three (fully substituted cellulose).



If W is the formula weight of the substituent group, W_s the net increase in formula weight of cellulose resulting from the introduction of one substituent group per anhydroglucose unit (162 parts of cellulose), and Y the percentage of substituent, then the DS may be calculated from equation 1.

$$DS = \frac{162Y}{100W - YW_s} \quad (1)$$

The extent of substitution is also frequently expressed as the percent of a substituent group, eg, % acetyl, or element, eg, % N; it may be calculated from equation 2.

$$Y = \frac{100W(DS)}{162 + W_s(DS)} \quad (2)$$

When the substituent has groups that can compete for the reagent with the functional groups present in the original polymer, eg, in the case of hydroxyethylcellulose, a distinction may be made between the degree of substitution,